July 18, 2006

SUBJECT: Study Issue - Carbon Dioxide Emissions Reduction Project and Approval of Budget Modification No. 3

REPORT IN BRIEF

The purpose of this study is to determine whether the City should join Sustainable Silicon Valley (SSV) and set a carbon dioxide (CO_2) emissions reduction goal. CO_2 is the main gas contributing to global warming. While some CO_2 is emitted through natural processes, the majority of the scientific community believes that increases in its concentration are mainly a result of the burning of fossil fuels. Global warming poses a number of significant risks such as more frequent/severe storms, loss of species, rise in sea level, droughts and heat waves. In order to alleviate the potential risks associated with global warming, numerous public and private entities are partnering with organizations such as SSV and the Environmental Protection Agency's Climate Leaders to define and measure progress toward a CO_2 emissions reduction goal.

Options available to the Council include:

1. Endorse the SSV goal and take no further action.
2. Endorse the SSV goal and direct staff to continue measuring and reporting to Council on the City's annual CO_2 emissions.
3. Become a pledging partner of SSV and direct staff to determine a reduction goal and return with a work plan and estimated budget for Council consideration.
4. Other action as determined by Council.

If the City Council decides that the City of Sunnyvale will become a pledging partner of Sustainable Silicon Valley and sets a CO_2 emissions reduction goal for 2010, staff recommends that the City work with the Energy Watch Partnership Program and obtain consultant services to identify and prioritize measures to help the City reduce its gasoline, diesel, natural gas and electricity usage.

BACKGROUND

The "greenhouse effect" refers to the natural phenomenon that keeps the Earth in a temperature range that allows life to flourish. The sun's energy warms the Earth's surface and its atmosphere. As this energy radiates back toward space

as heat, a portion is absorbed by a delicate balance of heat-trapping, or "greenhouse," gases in the atmosphere—among them carbon dioxide and methane—which creates an insulating layer. "Global warming" refers to the rise in the Earth's temperature resulting from an increase in heat-trapping gases in the atmosphere. As the concentration of these gases grows, more heat is trapped by the atmosphere and less escapes back into space. This increase in trapped heat changes the climate, which can have a variety of effects including altered weather patterns (e.g. unusually intense precipitation, dry spells, and more severe storms), a rise in sea level, increase in ocean water temperature, disruption of agriculture and severe stress on natural ecosystems.

In 2001, the United Nations Intergovernmental Panel on Climate Change (IPCC) drafted *Climate Change 2001: The Third Assessment Report* after examining the most current scientific information on global warming and climate change. More than 2,500 of the world's leading climate scientists, economists, and risk experts contributed to the panel's report. In its 2001 assessment, the IPCC strengthened its previous conclusion that human activities are contributing to global warming by adding large amounts of heat-trapping gases to the atmosphere. The report also stated that in order to have any impact on climate change a reduction of at least 20% from 1990 emission levels is needed.

In 2005, the U.S. National Academy of Sciences, the UK Royal Society, and the chief scientific bodies of India, Germany, Russia, Brazil, China, France, Japan, and Canada issued a joint statement that a) the climate is changing; b) this change is probably very dangerous; and c) it is caused by increased human-generated emissions of greenhouse gases.

The U.S. Climate Change Science Program was commissioned by the White House to "enhance understanding of natural and human-induced changes in the Earth's global environmental system…" and to "…provide a sound scientific basis for national and international decision making". Their first assessment, released in May 2006, stated, "the evidence continues to support a substantial human impact on global temperature increases" and "the observed patterns of change over the past 50 years cannot be explained by natural processes alone".[1]

Humans add large amounts of heat-trapping gases to the atmosphere – mainly through the use of fossil fuels. Every time someone drives a car, uses electricity from power plants fueled by coal, oil or natural gas, or heats his or her home with oil, natural gas or wood, he or she releases carbon dioxide and other heat-trapping gases into the air. Scientists predict that even if we stopped emitting

[1] U.S. Climate Change Science Program press release, *www.climatescience.gov/Library/pressreleases/pressrelease2may2006.htm*

heat-trapping gases immediately, the climate would not stabilize for many decades because the gases already released into the atmosphere will stay there for years or even centuries. And, the faster and more the Earth warms, the greater the chances are for some irreversible climate changes.[2]

In order to address global warming on an international level, the Kyoto Protocol was negotiated in 1997 and ratified by 155 countries in February 2005. The United States, which has approximately 4% of the world's people and uses over 25% of the world's energy, was a notable exception from this treaty. Ratifying the Kyoto Protocol would require the United States to reduce its greenhouse gas emissions by 7 percent below its 1990 levels by 2012. While there has not been a policy commitment to address global warming on the federal level, many states, municipalities and businesses in the U.S. have volunteered to meet carbon dioxide reduction goals.

California, which is the 12th largest emitter of greenhouse gases in the world, adopted a goal of reducing its greenhouse gas emissions to 2000 levels by 2010, a reduction to 1990 levels by 2020 and a reduction to 80 percent below 1990 levels by 2050.

At the municipal level, 248 Mayors from 41 states representing a total population of over 45 million citizens committed to the US Mayors Climate Protection Agreement. Under the Agreement, participating cities commit to strive to meet or exceed the Kyoto Protocol goals by taking action in the city's operations and community.[3] The City has no established policy on CO_2 emissions reductions so the City of Sunnyvale is not currently listed as an official signatory.

At the local level, SSV, a nonprofit organization sponsored by the California Environmental Protection Agency, the Silicon Valley Manufacturing Group and the Silicon Valley Environmental Partnership, identified CO_2 emission reduction as the foremost environmental goal for the area. SSV formed in 2001 and in 2004 it began working with businesses and municipalities to reduce their CO_2 emissions. It provides educational and networking forums and offers recognition and encouragement to its partners.

SSV offers a default goal for its "pledging partners" to reduce their 1990 levels of CO_2 emissions by 20% by the year 2010. However, pledging partners may choose the buildings/operations that they will measure, the baseline year, the

[2] Union of Concerned Scientists website, *www.ucsusa.org/global_warming/science/global-warming-faq.html*
[3] City of Seattle U.S. Mayors Climate Protection Agreement website, *www.ci.seattle.wa.us/mayor/climate/*, June 19, 2006

percentage reduction goal and the goal year. SSV suggests that each pledging partner measure (at minimum):

1. Electricity and natural gas usage from some or all of the organization's buildings
2. Gasoline and diesel usage of the organization's fleet

To become a pledging partner of SSV, an organization must pay annual dues, make a voluntary pledge to reduce CO_2 and report annually on the results (see Attachments A and B, SSV Pledge to Participate Template and SSV Reporting Protocol). SSV's pledging partners are as follows (as of May 26, 2006):

Businesses/Organizations

1. 3 Phases Energy Services
2. Acterra
3. Agilent Technologies
4. Akeena Solar
5. Alza Pharmaceuticals
6. BD (Becton, Dickinson and Company)
7. Calpine
8. Cisco Systems
9. Fat Spaniel Technologies
10. Great Mall
11. Hewlett-Packard
12. Lifescan/Johnson & Johnson
13. Lockheed Martin Space Systems
14. NASA Ames Research Center
15. Oracle
16. PG&E
17. Roche Palo Alto
18. Scherling-Plough
19. Sierra Club Loma Prieta Chapter
20. Specialty Solid Waste & Recycling
21. Sun Microsystems
22. Sustainable San Mateo
23. Toyota Sunnyvale

Public Entities

24. Bay Area Air Quality Management District
25. City of Los Altos Hills
26. City of Morgan Hill
27. City of Palo Alto
28. City of San Jose
29. County of San Mateo
30. County of Santa Clara
31. Santa Clara Valley Water District

(A sample of City and County CO_2 reduction goals are listed in Attachment C)

The City of Sunnyvale is currently a "general participant" in SSV, meaning that City representatives regularly attend SSV general meetings. Councilmember Melinda Hamilton has been the City of Sunnyvale's representative to SSV since 2005.

Consideration of whether to join SSV as a pledging partner was previously considered as a 2004 Study Issue and was dropped by the Council at that time. A new study issue on the same topic was proposed by Councilmember Moylan and ranked #3 out of the Department of Public Work's Proposed New Council Study Issues for calendar year 2006. The Study Issue Paper is shown as Attachment E.

EXISTING POLICY

CO_2 emissions are closely linked to energy usage. Thus, these existing City policies are relevant to a discussion of CO_2 emissions reductions:

Policy 3.5.1 Energy
Adopted in 2000, the City of Sunnyvale's Energy policy purpose states that the "preservation of natural resources through the use of energy efficient activities is of great importance to the citizens and businesses of Sunnyvale". The policy statement includes:

- Minimize energy consumption in City operations
- Use energy efficient street light and traffic signal systems
- Utilize alternative energy sources at the Sunnyvale Water Pollution Control Plant
- Support installation of cost-effective energy efficiency measures in municipally owned buildings and facilities

Sustainable Development and Green Buildings Policy
Adopted in 2004, this policy includes the requirement that prior to the planning or design of any new City facility over 10,000 square feet, LEED certification (which encompasses a variety of environmental attributes including energy efficiency) will be considered by Council.

City of Sunnyvale Environmental Procurement Policy (EPP)
Adopted in 1991, the City's EPP finds that "the preservation of natural resources, reduction of energy use and pollution, reduction of solid waste, and minimization of impact on the environment from City activities benefits all occupants of the City". The stated purpose of the policy includes that the City will "meet its current needs without compromising the ability of future generations to do the same". To this goal, the City will purchase "environmentally preferable products and services". This would include products and services (e.g. energy efficient products) that generate fewer greenhouse gases through their production and/or use.

Legislative Advocacy Position 3.7 (Air Quality) #10
"Support efforts to improve regulation of greenhouse gases."

DISCUSSION

The scientific consensus is that global warming is happening, it will likely have serious consequences, human activities are contributing to global warming by adding large amounts of heat-trapping gases to the atmosphere mainly through the use of fossil fuels and that organizations like the City should take action sooner rather than later. The most important action the City can take to slow

global warming is to reduce emissions of heat-trapping gases. Governments can do this through actions such as increasing the fuel efficiency of vehicle fleets, reducing electricity use and choosing renewable energy sources.

In an attempt to gauge the City of Sunnyvale's current CO_2 emissions, staff looked at fiscal year 00/01 – 04/05 data for:

- Gas, diesel and natural gas usage by City fleet
- Electricity and natural gas usage by 14 City buildings
- Electricity and natural gas usage by the Water Pollution Control Plant (see Attachment D, City of Sunnyvale CO_2 Emissions Data Summary)

Fiscal year 00-01 through 04-05 data was used for a preliminary analysis since it was readily available from City staff and PG&E.

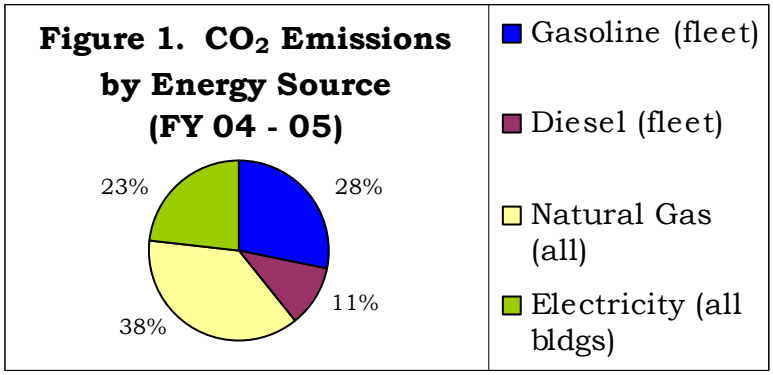

Figure 1 illustrates energy sources that the City used and how much each energy source contributed to the City's overall CO_2 emissions in Fiscal Year 04-05.

The five largest users of natural gas in fiscal year 04-05 were the Water Pollution Control Plant, City Hall, Community Center, Library and Corp Yard. The five largest users of electricity were the Library, Community Center, Public Safety Building, Annex and City Hall. In terms of overall tons of CO_2 emitted, the five largest sources are indicated in the table below:

Table 1. Five Largest Sources of CO_2 Emissions

CO_2 EMISSIONS SOURCE	**CO_2 EMISSIONS (in tons) FY 04-05**
Fleet (all fuel types)	4,969,614
WPCP	3,072,749
Library	686,312
Annex	563,014
Public Safety Building	439,603

The City has seen the following changes in its CO_2 emissions from fiscal year 00-01 through 04-05:

Table 2. Total CO2 Fiscal Year (FY) 00-01 through 04-05					
	FY 00-01	**FY 01-02**	**FY 02-03**	**FY 03-04**	**FY 04-05**
TOTAL TONS CO_2*	11,162,592	11,161,779	14,169,015	13,623,753	12,158,085

*Conversion figures provided by SSV.

Table 3. FY 04-05 Change in Total CO_2 Emissions by Baseline Year				
	If BASELINE is FY 00-01	**If BASELINE is FY 01-02**	**If BASELINE is FY 02-03**	**If BASELINE is FY 03-04**
PERCENTAGE CHANGE OF FY 04-05 CO_2 EMISSIONS	8.9%	8.9%	-14.2%	-10.8%

Table 3 offers an indication of how much the City's CO_2 emissions have changed since fiscal year 00-01. It also demonstrates how the percentage reduction of CO_2 emissions can vary greatly depending on the baseline year chosen.

The City has completed a variety of activities over the last several years, which have reduced its CO_2 emissions, including the following:

- Began to power the Water Pollution Control Plant operations with landfill gas (methane) which had previously been flared (1987)
- Switched from incandescent bulbs to light-emitting diode (LED) bulbs in exit signs at some City facilities (1996, 2001)
- Replaced light bulbs and ballasts with energy-efficient options in City facilities, excluding park buildings (1996-97)
- Installed motion sensors and lighting controls in some City facilities (1996-97)
- Replaced incandescent bulbs with LED bulbs in the City's traffic signal lights (1998-2000)
- Replaced gasoline or diesel powered vehicles with electric, natural gas or hybrid vehicles (ongoing)
- Replaced HVAC: City Hall (2000) and City Annex (2004)
- Installed T-5 fluorescent lights in Community Center gym (2005)
- Participated in PG&E's Demand Response Program (ongoing)

The following completed and planned City projects would be included in future measurements of the City's CO_2 emissions:

- Replacement of six old refrigerators in City facilities with energy-efficient models (2006 - Completed)

- HVAC replacement: Library (2006 - Completed) and Public Safety (2007)
- Additional replacements of light bulbs and ballasts with energy-efficient options in City facilities (2006)
- City Hall Energy Management System (2007/2008)

While these projects will reduce CO_2 emissions from some specific existing sources, it is difficult to determine whether they will result in an overall reduction in the City's CO_2 emissions given the large number of sources and variables. In order to determine whether additional energy- or fuel-saving measures should be implemented, the City could continue to measure its CO_2 emissions from fleet and City buildings over the next several fiscal years and report these figures to the City Council. Or, if the City Council determines that a reduction goal should be set at this time, the City could join SSV, set a CO_2 emissions reduction goal, and report on its progress toward this goal using SSV's online reporting tool and through subsequent Council reports.

If Council decides to set a CO_2 emissions reduction goal for 2010, technical and financial assistance is available to help the City determine ways to increase energy efficiency and reduce CO_2 emissions. These include but are not limited to:

- *PG&E Energy Watch Partnership Program* (previously the Local Government Energy Partnership) – energy audits, project prioritization, design reviews and project implementation assistance; incentives and rebates for on-site renewable and energy-efficient projects
- *California Energy Commission* – energy audits, design reviews and project implementation assistance; low-interest loans for energy-saving projects

The City would need to seek the assistance of a consultant to evaluate its CO_2 emissions from 1990 forward, to determine the most appropriate baseline year and to create a Climate Action Plan, which identifies the associated costs, savings and payback periods for measures that the City could take to reduce its CO_2 emissions. Key methods to reduce CO_2 emissions could include:

- choosing fuel-efficient vehicles
- increasing the energy efficiency of existing City facilities
- purchasing energy-efficient equipment
- building energy-efficient buildings that replace existing buildings

The City may also need to seek opportunities to convert existing buildings to renewable energy sources and/or to purchase "green" energy, educate employees on ways to save energy at work and consider new technologies and innovative approaches to reach the proposed goals. Additional funds may be required to implement any fuel- or energy-saving measures. The cost of investing in these measures could result in long-term operational cost savings

to the City, although further study and analysis would be required to calculate the payback periods for the various measures. The Climate Action Plan would be submitted to the Council for review and approval prior to implementation.

While there could be substantial initial costs associated with improving fuel- and energy-efficiency, it is important to note that the City may also realize short- and long-term savings through the implementation of additional efficiency measures. The City would be demonstrating its commitment to conserving resources, reducing pollution, enhancing its environment quality and the quality of life of City residents. The City would also take its place as a leader in air quality, energy reduction, and climate change programs.

The Facility Services Division of the Department of Parks and Recreation would take the lead role, as the more significant CO_2 emissions reduction opportunities have to do with City facilities.

FISCAL IMPACT

The cost for this project will vary depending on whether the City chooses to only endorse the SSV goal or to also measure its CO2 emissions, set a reduction goal and report on its progress. Below are the cost estimates for these alternatives:

Alternative 1: Become a pledging partner of SSV and direct staff to determine a reduction goal, select a baseline year and return with a work plan and estimated budget for Council consideration – Annual SSV dues are $1,000; labor costs are $6,800; and a one time Consultant costs estimated at $15,000:

Estimated Consultant Fees (one-time)	$15,000
SSV Dues (annual)	$1,000
Estimated Operating Labor Cost (annual)	$6,800
Total Estimated Cost	**$22,800**

The total cost for FY 2006/2007 is $22,800 which includes a one time consultant fee estimated at $15,000, annual dues and ongoing staff labor costs estimated at $7,800. Staff recommends that this project be funded by the General Fund Service Level Set-Aside. This project could be established and its initial budget set by Council. A consultant would provide the City with a list of options that could help it meet its CO_2 emissions reduction goal. Additional funds would be required to implement the fuel- and/or energy-saving measures suggested. According to the Facilities Maintenance Division, those funds could total hundreds of thousands or even millions of dollars in capital and operational costs. The cost of investing in any fuel- or energy-saving measures could also result in operating cost savings to the City. The consultant would analyze costs and savings to calculate the payback periods for and evaluate the

cost effectiveness of the various measures that the City could choose to implement.

BUDGET MODIFICATION NO. 3
FISCAL YEAR 2006/2007

	Current	Increase (Decrease)	Revised
General Fund			
Expenditures:			
New Project - CO2 Emissions Reduction Project	$ 0	$ 22,800	$ 22,800
Reserves:			
Service Level Set-Aside	$458,000	($ 22,800)	$435,200

Alternative 2: Endorse the SSV goal and direct staff to continue measuring and reporting to Council on the City's annual CO_2 emissions from fleet and City buildings with a cost of approximately $3,000 for labor. The budget modification would be proportionally adjusted to reflect the $3,000 cost.

Alternative 3: Endorse the SSV goal and take no further action – *No fiscal impact*

Alternative 4: Other action as determined by Council – *Fiscal impact unknown*

CONCLUSION

Given the extensive and potentially irreversible risks associated with global warming, this issue warrants serious consideration for action by the City of Sunnyvale. SSV offers its existing resources and online reporting tool to local jurisdictions and businesses for determining baseline CO_2 emissions, setting a reduction target and reporting on progress toward that target.

The City Council may deem it unnecessary to take additional steps to measure or reduce the City's CO_2 emissions and simply endorse SSV's overall goal of reducing CO_2 emissions in Silicon Valley. Council could take an additional step and opt to have staff continue measuring the City's emissions each year. Or, Council may choose to become a pledging partner of SSV and set a CO_2 emissions reduction goal. The City could use no-cost technical assistance and also the assistance of a consultant to determine which measures could help the City reach its goal.

If a CO_2 emissions reduction goal is set, additional funds may be required to implement any fuel- or energy-saving measures. The cost of investing in these measures could result in short- or long-term operating cost savings to the City. Potential measures with significant costs would be submitted to Council for approval prior to implementation. City staff would report on progress toward the City's reduction goal using SSV's online reporting tool and through subsequent Reports to Council.

PUBLIC CONTACT

This report was included in the publication and posting of the Council agenda on the City's official notice bulletin board and the City's web page. This report is also available at the Sunnyvale Public Library and the City Clerk's Office.

ALTERNATIVES

1. Become a pledging partner of SSV and direct staff to determine a reduction goal, select a baseline year and return with a work plan; and, approve Budget Modification No. 3 in the amount of $22,800 for annual SSV dues, labor costs and a one time consultant cost.
2. Endorse the SSV goal and direct staff to continue measuring and reporting to Council on the City's annual CO_2 emissions from fleet and City buildings with a cost of approximately $3,000 for labor. The budget modification would be proportionally adjusted to reflect the $3,000 cost.
3. Endorse the SSV goal and take no further action.
4. Other action as determined by Council.

RECOMMENDATION

Staff recommends Alternative #1 - Become a pledging partner of SSV and direct staff to determine a reduction goal, select a baseline year and return with a work plan; and, approve Budget Modification No. 3 in the amount of $22,800 for annual SSV dues, labor costs and a one time consultant cost.

In order to effectively address the City's contribution, as measured by CO_2 emissions, to global warming, the City would need to 1) determine its baseline inventory of CO_2 emission, 2) set a reduction target, 3) develop a Climate Action Plan, 4) implement its plan, and 5) monitor and report on its progress toward its reduction target. These actions are encompassed in Alternative #1.

Reviewed by the following:

_____
Marvin Rose, Director, Public Works
Prepared by: Julie Benabente, Administrative Aide

_____
David Lewis, Director, Parks and Recreation

_____
Mary Bradley, Director, Finance

Approved by:

_____
Amy Chan
City Manager

Attachments

A. Pledge to Participate Template
B. SSV Reporting Protocol
C. City and County CO_2 Reduction Goals
D. City of Sunnyvale CO_2 Emissions Data Summary
E. Study Issue Paper—Carbon Dioxide Emissions Reduction Project

Pledge to Participate – Sustainable Silicon Valleyfd **Attachment A**

(Sample letter written on organization's letterhead and signed by a responsible officer of the organization)

Date

Ms. Sally Tomlinson
Executive Director
Sustainable Silicon Valley
224 Airport Parkway, Suite 620
San Jose, CA 95110

Dear Ms. Tomlinson:

(Organization) is pleased to support the efforts of Sustainable Silicon Valley (SSV) and hereby commits to take part in SSV's Carbon Dioxide (CO_2) Emissions Reduction Initiative.

The following facilities and their associated Standard Industrial Classification (SIC) Code are included in this commitment:

1. ___(address)_____; SIC Code _____
2. ___(address)_____; SIC Code _____
3. ___(address)_____; SIC Code _____

As we make this commitment we understand that by **(date)**, we will prepare a report to SSV for the facilities identified above for a twelve (12) month period. In this report we will identify:

1. a baseline reporting year for each facility, 1990 or later;
2. a goal for CO_2 emissions reduction (percentage and year) for each facility;
3. a normalizing factor (optional) for each facility;
4. the amount of electricity and natural gas used in each facility annually since the base year selected;
5. the amount of diesel and/or gasoline used in each facility for any or all of the following: fleet, employee business use of personal vehicles, employee commuting (optional clause for each facility);
6. a comparison of energy use (or CO_2 emissions) reported for each facility in the current year to the base year; and
7. a brief description (one-two paragraphs) of some (two-five) of the key actions taken that led to the decreasing emissions of CO_2. We understand that this information will likely be shared with others as "best practices" and included in SSV's annual reports with or without (at our option) attribution.

The information we submit will be used in the SSV report published annually. Energy use will be reported either in kWh of electricity, therms of natural gas and gallons of diesel/gasoline or in pounds/tons of annual CO_2 emissions. If we choose to normalize our energy use/CO_2 emissions, we will also include the normalizing factor in this annual report. If we get better data after submitting our annual report to SSV, for example, more accurate or comprehensive data or data certified by a third party, we will submit the improved data.

We also understand that the SSV Carbon Dioxide Emissions Reduction Initiative is a voluntary project; there are no sanctions for our failing to meet our goal. Nonetheless, we will make a concerted effort to reach the goal established.

The following person is the point of contact for our organization for this project: **(name), (address), (telephone), and (email)**.

Sincerely,

Signature
Typed name and title
Senior Management Representative

CO_2 Emissions Reduction Target and Reporting Protocol Sustainable Silicon Valley

Reporting Protocol

Summary of the SSV Protocol for Measuring and Reporting CO_2 emissions

Table 2 summarizes the steps for participating in the SSV CO_2 Emissions Reduction Project.

Table 2: Steps for Participants in the SSV CO_2 Emissions Reduction Project

A participating organization will:

1. Choose one (or more) of its facilities in Silicon Valley;
2. Select a baseline reporting year for each facility;
3. Track each facility's annual electricity and natural gas use;
4. Adopt a goal for CO_2 emissions reduction (percentage and year),
5. Report annually to SSV (either annual energy use or convert total energy use (kWh, therms, gallons) into CO_2, to determine total annual emissions). If the participant chooses to use a normalizing factor, that factor should also be reported annually.
6. Include a brief description (one-two paragraphs) of some (two-five) of the key actions it has taken that led to the decreasing emissions of CO_2.

In addition, organizations may:

1. Select a normalizing factor for each facility;
2. Track its diesel and/or gasoline use for its fleet, employee business use of personal vehicles, and/or employee commuting;

This is a voluntary project; there are no sanctions for a participant failing to meet its goal.

How will my organization be recognized for its achievements?

SSV will release a report annually, documenting CO_2 emissions in the region and compare it to the 2010 goal. Publication of this report will most likely be via the worldwide web. Included in the SSV annual report will be:

- A list of all project participants,
- Highlights of the organizations achieving the most substantial CO_2 emissions reductions in the previous reporting period and since their base years,
- Highlights of the actions taken by project participants that led to the decreasing emissions of CO_2, and
- Beginning in 2005, the organizations matching or exceeding the Valley goal of 20% CO_2 reductions on an absolute or normalized basis and highlights of their efforts.

At a participant's request, the SSV can provide shareholders or customers with documentation of an organization's participation in this regional goal as part of demonstrating their Environmental Stewardship or Corporate Social Responsibility programs.

Who may participate?
All organizations in Silicon Valley (which for this purpose includes the counties of Santa Clara, San Mateo and Alameda) are invited and encouraged to participate. This includes all sizes and types of businesses, governmental, educational, and non-governmental organizations and associations.

To be listed as a project participant in the SSV annual report, an organization must complete the six steps in Table 2 above and submit a report, which demonstrates a reduction in CO_2 emissions.

Participants that meet or exceed the Silicon Valley regional goal of 20 percent reduction in its CO_2 emissions will be listed and have specific highlights in the annual report.

Detailed Information On the Measuring and Reporting of CO_2 emissions

Physical site: While the intent is to provide for a broad level of participation, an organization may choose any facility in Silicon Valley for inclusion in this effort. If an organization has two physically independent facilities in Silicon Valley, e.g., in different parts of the Valley, either or both can be included. However, an entire physically-dependent facility must be included. The general rule is that multiple buildings/facilities at a single physical site that share electric and natural gas meters must be included.

Examples: The entire administration building must be included in the program rather than one or several departments in the building. An entire manufacturing site must be included, rather than just the warehouse building unless the warehouse is physically independent from the manufacturing facility, i.e., located in a different place and with its own electric and natural gas meters.

Energy use measured: Ideally, all of the major uses of fossil-based energy in Silicon Valley, i.e., electricity, natural gas, diesel and gasoline, would be measured. At a minimum, annual electricity and natural gas usage will be tracked over time. Information readily available from a participant's electricity and natural gas bills will suffice for these measurement purposes.

Gasoline and diesel fuel usage is more difficult to measure. A participant may choose not to include the gasoline and diesel fuel usage at all. (However, the participant may lose significant potential for emissions reduction since gasoline accounts for more than half of the CO_2 emissions in the Valley. Additionally, the California Climate Action Registry requires inclusion of fleet vehicles)

Alternatively, a participant may choose to include only its fleet's use of gasoline and diesel fuel. Presumably the participant would have a record of gasoline and diesel fuel usage by its fleet. Or, a participant may choose to include an estimate of its employees' use of gasoline for commuting and company business. Measurement of employee use of gasoline can be determined by the participant, but the measurement protocol must be consistent over time.[12] Whichever energy use is being reported by an organization, the measures should be consistent over time.

Energy Use and Carbon Dioxide Emissions to be Reported: A participant may report either its annual energy use in kWh of electricity, therms of natural gas and (if included in the participant's measurements) gallons of gasoline and diesel fuel. Alternatively, the participant may convert these energy measures into the carbon dioxide emissions that results in the use of the energy (see Table 3).

Table 3: Fossil Fuel Use → Carbon Conversion factors:

Fuel	Carbon (C) Conversion Factor & Source	Geographically-Based Participants (city, county)	Facility-Based Participants (company, NGO, government use)
Natural gas	3.174 lbs C/therm or 11.64 lbs CO_2 per therm (EPA Workbook 1995)	Annual natural gas **sales (therms) within the city or county** multiplied by 11.64 lbs CO_2 per therm divided by 2000 lbs/ton.	Annual natural gas **sales to the facility** multiplied by 11.64 lbs CO_2 per therm divided by 2000 lbs/ton.
Gasoline	5.30 lbs C/gallon or 19.43 lbs CO_2 per gallon (EPA Workbook 1995)	Annual gasoline **sales (gallons) within the city or county** (from Board of Equalization) multiplied by 19.43 lbs CO_2 per gallon divided by 2000 lbs/ton.	Annual gasoline **usage by facility fleet** (gallons) multiplied by 19.43 lbs CO_2 per gallon divided by 2000 lbs/ton. Fleet usage determined by sales invoices. Employee commute mileage (if measured) to be determined by participant.
Diesel	5.74 lbs C/gallon or 21.05 lbs CO_2 per gallon[13]	Annual diesel **sales (gallons) within the city or county** multiplied by 21.05 lbs CO_2 per gallon divided by 2000 lbs/ton.	Annual diesel **usage by facility fleet** (gallons) multiplied by 21.05 lbs CO_2 per gallon divided by 2000 lbs/ton. Fleet usage determined by sales invoices.
Electricity	Annual PG&E-specific electric generation portfolio determines weighted average lbs CO_2 per kWh sold in Santa Clara County (from CEC and SVEP)	Annual electricity **sales (kWh) within the city or county** multiplied by appropriate factor divided by 2000 lbs/ton.	Annual electricity **sales (kWh) within the facility** multiplied by appropriate factor divided by 2000 lbs/ton.

Base year: The participant that strives to be highlighted as having adopted a CO_2 emissions reduction goal that meets or exceeds the Silicon Valley regional goal of 20 percent may select as a base year any year after 1989. Since the SSV goal is to reduce CO_2 emissions in 2010 to a level 20 percent below the 1990 level, the CO_2 emissions in the base year chosen determines the participant's goal for 2010. Table 4 depicts the goal for each base year chosen.

Table 4: Estimated CO_2 Emissions in Silicon Valley and Goal for Each Base Year

Base Year	CO_2 emissions (thousand tons)	Goal for 2010
1990	13,421	20%
1991	13,189	19%
1992	13,273	19%
1993	12,814	16%
1994	14,221	25%
1995	12,269	12%
1996	12,454	14%
1997	13,525	21%
1998	14,097	24%
1999	15,627	31%
2000	15,699	32%

Normalization of CO_2 emissions: Each participant may choose to adopt an absolute or normalized goal and determines which (if any) normalization factor is to be used. Among the more commonly used normalization factors are sales, number of employees, square footage of facilities, and number of vehicles in a fleet.

A participant that strives to be highlighted as having adopted a CO_2 emissions reduction goal that meets or exceeds the Silicon Valley regional goal of 20 percent choosing 1993 as a base year and an absolute goal would commit to reducing its CO_2 emissions in 2010 by 16.21 percent. A participant choosing 1993 as a base year and a goal normalized for sales would commit to reducing its CO_2 emissions per unit of sales in 2010 by 16.21 percent.

Frequency of reporting: Each participant should report annually to the SSV administrator three months after the end of the participant's fiscal year (or the calendar year). This report should be sent electronically to the SSV administrator (address TBD).

Content of Report: To enable effective tracking, the participant's report should include:

1. Name of the organization;
2. Address of the participating facility(ies);
3. Standard Industrial Classification (SIC) Code of the participating facility(ies);
4. Contact information, i.e., name, address, telephone, and email, for the key person gathering the data;
5. Energy sources being tracked, e.g., natural gas, electricity, gasoline, diesel;
6. Base year adopted and CO_2 emissions reduction goal;
7. Normalization factor (if any);
8. Energy use tracked annually since the base year and through the most current year (this information can be provided in units of energy or CO_2 emissions as described above).
9. Comparison of energy use (or CO_2 emissions) reported for the current year to the base year.
10. A short narrative of activities/programs undertaken or planned to meet the 2010 target. (This information will likely be shared with others as "best practices" and included in SSV's annual reports).

To the extent a participant gets better data after submitting its annual report to SSV, for example more accurate or comprehensive data or data certified by a third party, it should submit the improved data.

---

[11] A number of measures could be used. One way of doing this would be for the participating organization to survey its employees annually to determine their mode of commuting to work. If the commute mode is automobile, other information should be ascertained, such as the average fuel economy (miles/gallon) of the vehicle (or type of automobile, e.g., subcompact, compact…SUV), number of miles driven per week, number of people in the vehicle, and other relevant information. With this information the average gasoline usage (gallons) can be determined. Additionally, CCAR works closely with the California Air Resources Board to ensure that emission factors are as up-to-date as possible and participants in the Silicon Valley challenge can access these factors through CCAR's Protocol and its regular updates.

[12] Diesel: 130,500 Btu/gallon (source: http://bioenergy.ornl.gov/papers/misc/energy_conv.html)
44.0 pounds Carbon per MMBtu (source: http://www.energy.ca.gov/reports/600-02-001F/2002-09-14_600-02-001F.PDF. 44/12 = molecular weight of CO_2/C.
Calculation: 44/12*44.0*0.1305 = 21.054 lbs CO_2/gallon (or 5.742 lbs C/gallon)

///

Attachment C

Local City and County
CO_2 Emissions Reduction Goals

Jurisdiction	Baseline Year	CO_2 Reduction Goal	Goal Year	Facilities Measured	Notes
City of Palo Alto	2000	• 37% - City Hall • 32% - Waste Water Treatment Facility	2010	• City Hall • Waste Water Treatment Facility	Current goals include: • Buying 20% renewable energy before 2015 • Expanding CO_2 measurement to fleet Reduction will include: • Use of landfill gas to fuel sewage treatment plant (reduced natural gas use by 50%)
City of San Jose	Apr. 1999 – Mar. 2000	12%	2010	• Water Pollution Control Plant • Airport terminals A & C • Santa Teresa branch library	
San Mateo County	Fiscal Year 2004-2005	10%	2010	• County buildings • Fleet	Current goals include: • Reducing electricity use by 20% by 2010 • Maintaining current level of natural gas use • Promoting energy conservation practices • Raising the published miles per gallon (mpg) average of the County passenger vehicle fleet by 5 mpg by 2010. The current average of County passenger vehicles is 22 mpg.
Santa Clara County	1996	20%	2010	• Berger Dr. Roads and Airports complex • Jail complex on West Hedding • Civic Center complex on Younger	Focus on reducing electricity use through the installation of energy-saving measures such as: • chiller replacements • programmable thermostats • lighting controls • relamping and delamping • adding economizers to HVAC systems • energy audit services

Attachment D

City of Sunnyvale CO_2 Emissions Data Summary

Fiscal Year (FY) 00-01 through 04-05
Usage Data

SOURCE	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05
Fleet (gasoline) - gal.	214,437	211,526	199,083	190,532	180,024
Fleet (diesel) - gal.	65,963	76,661	69,749	62,499	65,057
Fleet (natural gas) - therms	6,113	14,508	18,026	14,898	14,226
Buildings[1] (natural gas) - therms	147,011	144,286	186,674	147,349	114,075
Buildings (electricity) - kWh	5,997,840	5,628,047	5,919,236	5,742,487	5,936,533
Water Pollution Control Plant (natural gas) - therms	4,463	4,463	280,135	337,330	259,511
Water Pollution Control Plant (electricity) - kWh	2,196,738	2,063,661	1,035,045	359,032	121,769

[1] Buildings include: Annex, City Hall, Community Center, Corp Yard, Fire Station #1-6, Library, Public Safety, Senior Center, South Annex

FY 00-01 through 04-05
Usage Data Converted to Tons of CO_2 Emissions[2]

SOURCE	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05
Fleet (gasoline)	4,091,458	4,035,916	3,798,504	3,635,351	3,434,858
Fleet (diesel)	1,388,521	1,613,714	1,468,216	1,315,604	1,369,450
Fleet (natural gas)	71,033	168,583	209,462	173,115	165,306
Subtotal (Fleet)	***5,551,012***	***5,818,213***	***5,476,182***	***5,124,069***	***4,969,614***
Buildings (natural gas)	1,708,268	1,676,603	2,169,152	1,712,195	1,325,552
Buildings (electricity)	2,818,985	2,645,182	2,782,041	2,698,969	2,790,171
Subtotal (Buildings)	***4,527,253***	***4,321,785***	***4,951,193***	***4,411,164***	***4,115,722***
Water Pollution Control Plant (natural gas)	51,860	51,860	3,255,169	3,919,775	3,015,518
Water Pollution Control Plant (electricity)	1,032,467	969,921	486,471	168,745	57,231
Subtotal (WPCP)	***1,084,327***	***1,021,781***	***3,741,640***	***4,088,520***	***3,072,749***
TOTAL	**11,162,592**	**11,161,779**	**14,169,015**	**13,623,753**	**12,158,085**

[2] CO_2 conversion figures provided by Sustainable Silicon Valley: gasoline – 19.08; diesel – 21.05; natural gas – 11.62; kWh – 0.47

Proposed New Council Study Issue

Number	DPW-18
Status	Pending
Calendar Year	2006
New or Old	New
Title	Carbon Dioxide Emissions Reduction Project
Lead Department	Public Works
Element or SubElement	None

1. What are the key elements of the issue? What precipitated it?

Sustainable Silicon Valley (SSV) has set a goal of reducing Silicon Valley carbon dioxide (CO2) emissions to 20% below 1990 levels by 2010. In 1990, 13.42 million tons of CO2, a "greenhouse gas" that contributes to global warming, were emitted into the atmosphere in Silicon Valley. Achieving the SSV goal means that no more than 10.74 million tons of CO2 will be emitted in 2010. Businesses and municipalities interested in supporting the 20% target will be invited to participate in this pilot project by quantifying the associated CO2 emissions reduction benefit and pledging their continued efforts to save energy and switch to less carbon intensive fuels, thus reducing their CO2 emissions. Contributions toward meeting the regional CO2 emissions reduction goal will be charted and progress toward the Valley goal will be shared with the public. A participating entity is asked to:

- Choose one (or more) of its facilities in Silicon Valley
- Select a baseline reporting year for each facility
- Adopt a goal for CO2 emissions reduction (percentage and year)
- Select a normalizing factor (optional) for each facility
- Track each facility's annual electricity and natural gas use. Optionally, track its diesel and/or gasoline use for its fleet, employee business use of personal vehicles, and/or employee commuting
- Report annually to SSV (either annual energy use or convert total energy use into pounds of CO2)
- Include a brief description of some of the key actions it has taken that led to the decreasing emissions of CO2

Ideally, all of the major uses of fossil-based energy, i.e., electricity, natural gas, diesel and gasoline, would be measured. At a minimum, annual electricity and natural gas usage would be tracked over time.

The question before the Council is whether or not it wishes to establish a policy that supports the Sustainable Silicon Valley goal of reducing CO2 emissions by 20%.

This item was previously considered by the Council as a 2004 Study Issue at the workshop in December 2003 and was dropped at that time by a vote of 7-0.

2. How does this relate to the General Plan or existing City Policy?

The City has no policy regarding the Sustainable Silicon Valley initiative.

3. **Origin of issue**

Council Member(s)	Moylan
General Plan	
City Staff	
Public	
Board or Commission	none

Board or Commission ranked this study issue ____ of ____

Board or Commission ranking comments

4. **Multiple Year Project?** Yes **Planned Complete Date** 2007

5. **Estimated work hours for completion of the study issue (use 5 or 8-hour increments)**

Community Development	10
Finance	10
Parks and Recreation	10
Public Works	20
Total Hours	50

6. **Expected participation involved in the study issue process?**

Does Council need to approve a work plan?	No
Does this issue require review by a Board/Commission?	No
If so, which?	
Is a Council Study Session anticipated?	No

What is the public participation process?
Not Applicable

7. **Cost of Study**

Operating Budget Program covering costs

Project Budget covering costs

Budget modification $ amount needed for study
$20-40,000

Explain below what the additional funding will be used for
The additional funding shown above is the estimated cost of consultant expenses to conduct an assessment of the City's energy information systems, to establish an energy baseline using 1990 data, and to set up tracking and reporting systems for current energy usage in order to determine if the 20% reduction goal has been met. This study would be called for if the Council, in considering a 2006 Report to Council on this issue, chose to go beyond endorsing the SSV goal (see Scenarios 2-4 in Section 8, below). A range of costs is shown because it is unclear how difficult it will be to locate the records necessary to establish baseline CO2 generation, how far back in time the baseline year could be established, how complex the research and calculations would be, or how consultants would approach such a project if the City issued a Request for Proposals.

8. **Potential fiscal impact to implement recommendations in the Study approved by Council**

Capital expenditure range	$51K - $100K
Operating expenditure range	$51K - $100K
New revenues/savings range	$500 - $50K

Explain impact briefly

If this Study Issue is brought back to the Council as a 2006 Report to Council and the Council chose to establish a policy that supports the Sustainable Silicon Valley goal of reducing CO2 emissions by 20%, the fiscal impact would depend on the decision(s) the Council made at that time.

The Council could:

1. Endorse the SSV goal and take no further actions. In this case, there would be no fiscal impact.
2. Endorse the SSV goal and simply direct staff to determine how the City's CO2 emissions have changed since 1990 (i.e. determine whether the City has already met the 20% reduction goal). This would result in consultant costs estimated at $20-40,000, as discussed in Section 7, above.
3. Endorse the SSV goal and direct staff to determine how the City's CO2 emissions have changed since 1990 (i.e. determine whether the City has already met the 20% reduction goal), and continue to monitor City CO2 emissions into the future. This would result in consultant costs estimated at $20-40,000, and ongoing monitoring/reporting expenses estimated to be $10,000 per year.
4. Endorse the SSV goal, direct staff to determine how the City's CO2 emissions have changed since 1990, and (if the consultant study showed less than a 20% CO2 reduction) fund a project intended to reduce CO2 emissions by 20% and monitor/report on those emissions reductions. There is not sufficient information to predict the potential capital and operating expense of this most speculative scenario, so the $51-100,000 amounts shown above should be consider little more than placeholders for future estimates. Some modest savings in operating costs due to reduced energy purchases would also be likely, as shown above.

It is unclear what the consultant study discussed in scenarios 2-4 would reveal about how the City's CO2/energy use has changed since 1990, or if it would be primarily documenting the City's prior energy conservation accomplishments. A number of energy conservation projects have already been completed in the City. For example, waste digester and landfill gases are the primary sources of the electricity that powers the Water Pollution Control Plant. PG&E rate schedules are regularly reviewed by the departments of Public Works and Parks & Recreation to ensure the most optimal rates. Energy saving devices have been installed and lighting /heating / cooling configurations are periodically reviewed by the Facilities Division. The City's fleet purchases are made with fuel efficiency as a key criterion and the fleet has a number of alternative fuel vehicles, as does the garbage collection franchisee.

9. Staff Recommendation for this calendar year

Recommendation None

If 'For Study' or 'Against Study', explain

Note: If staff's recommendation is 'For Study' or 'Against Study', the Director should note the relative importance of this Study to other major projects that the department is currently working on or that are soon to begin, and the impact on existing services/priorities.

Reviewed by

Mar D Rose
Department Director

12/6/05
Date

Approved by
for Chan
City Manager

12-7-05
Date